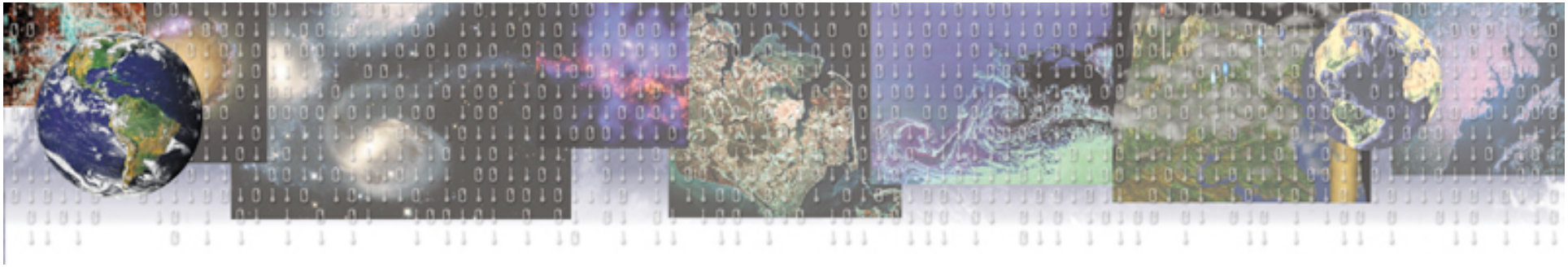

ECHO – An Earth Science Data and Service Registry/Broker

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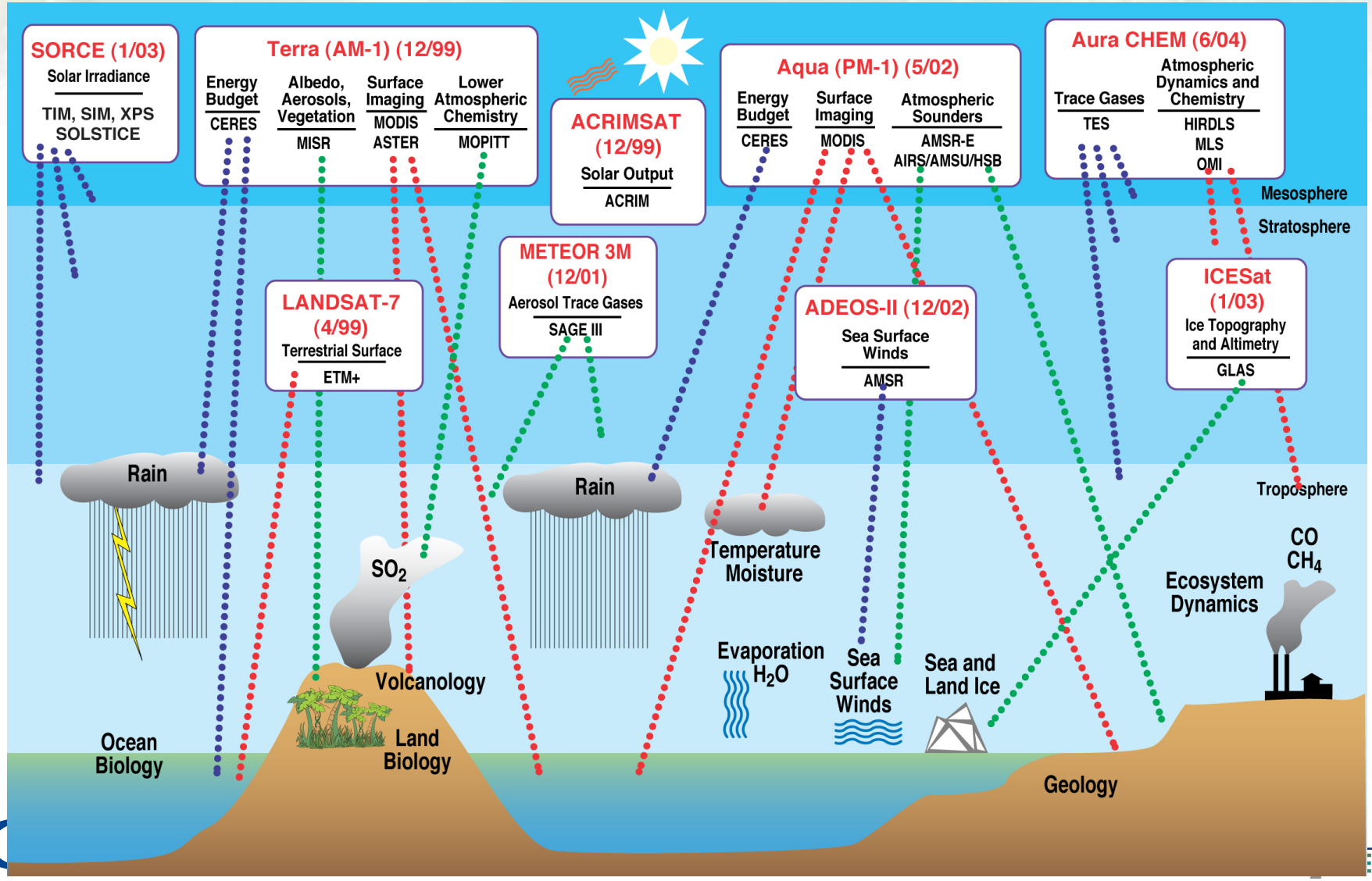
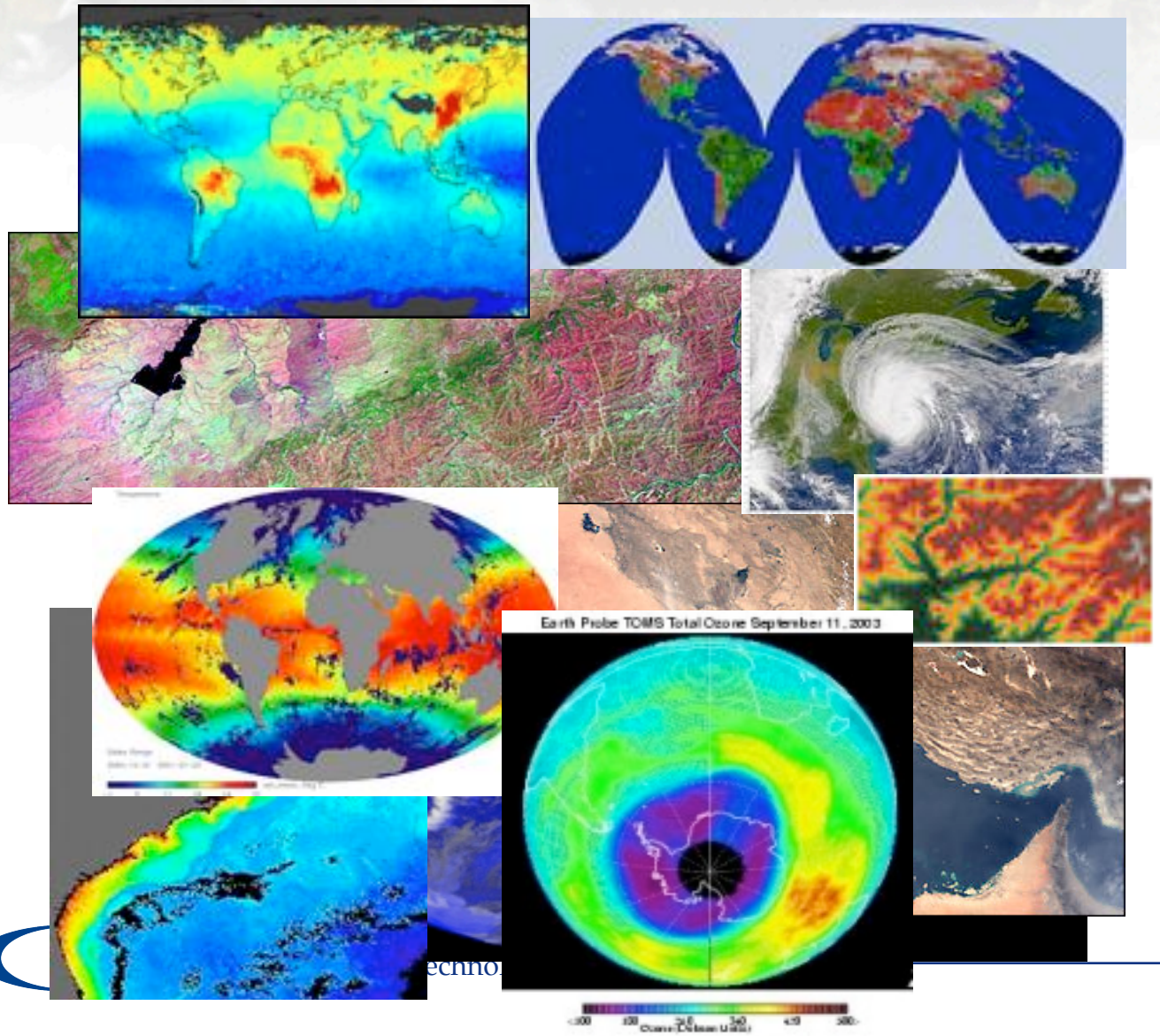
Background and Context

Missions, Platforms, & Instruments



Background and Context
Data Complexity



- Data from 22 Instruments on 9 spacecraft and field Campaigns
- 1,786 product types
- 3 PB today
- adding 4.5 TB/ day

Services Provided

- **Interoperability middleware solution enabling a marketplace of resource offerings**
  - Open, XML-based APIs
  - Supporting net-centric architectures and solutions
  - Set of interoperable registries for both data (metadata) and services
  - Provides user accounts and common infrastructure for the registries
  - Inventory-level browse image repository
  - Built upon a layered architecture with extensible infrastructure for supporting community unique protocols
  - Available as open source for reuse in other domains or applications

Data Registry

Representing data resources through metadata

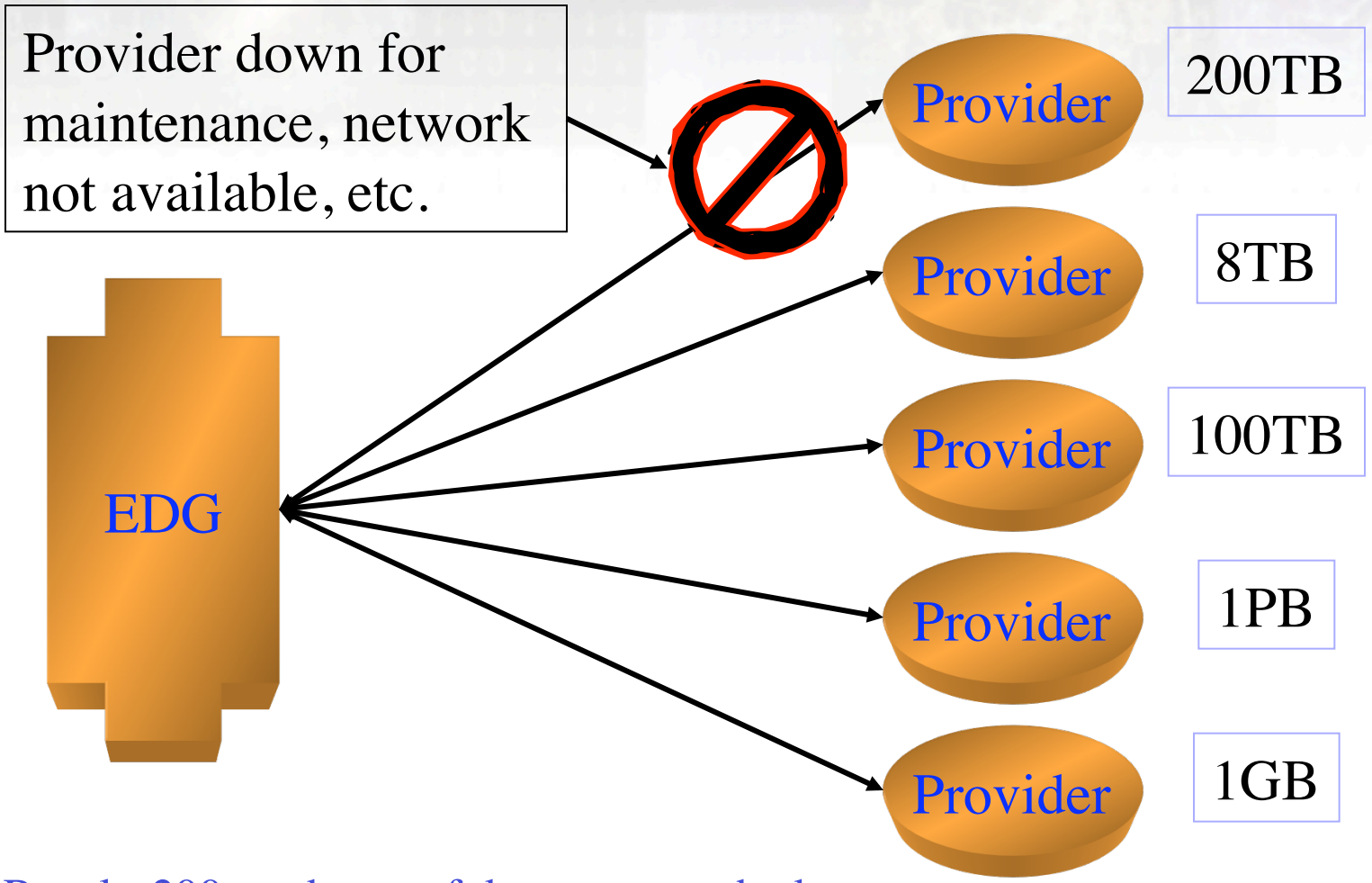
- **Publish Capability**
  - Supports Collection, Granules and Browse publication
  - Product Specific Attributes extend the standard data model
- **Discovery Capability**
  - Collection/Dataset
  - Granule/Inventory
  - Based on Z39.50 Standard
  - Full Results Management
- **Access Capability**
  - Online Access
  - Legacy Order Mechanisms
  - Access Controls
    - Visibility of / Access to data resources
- **Metadata Subscriptions**

Service Registry

Service offerings leveraging Web Service Standards

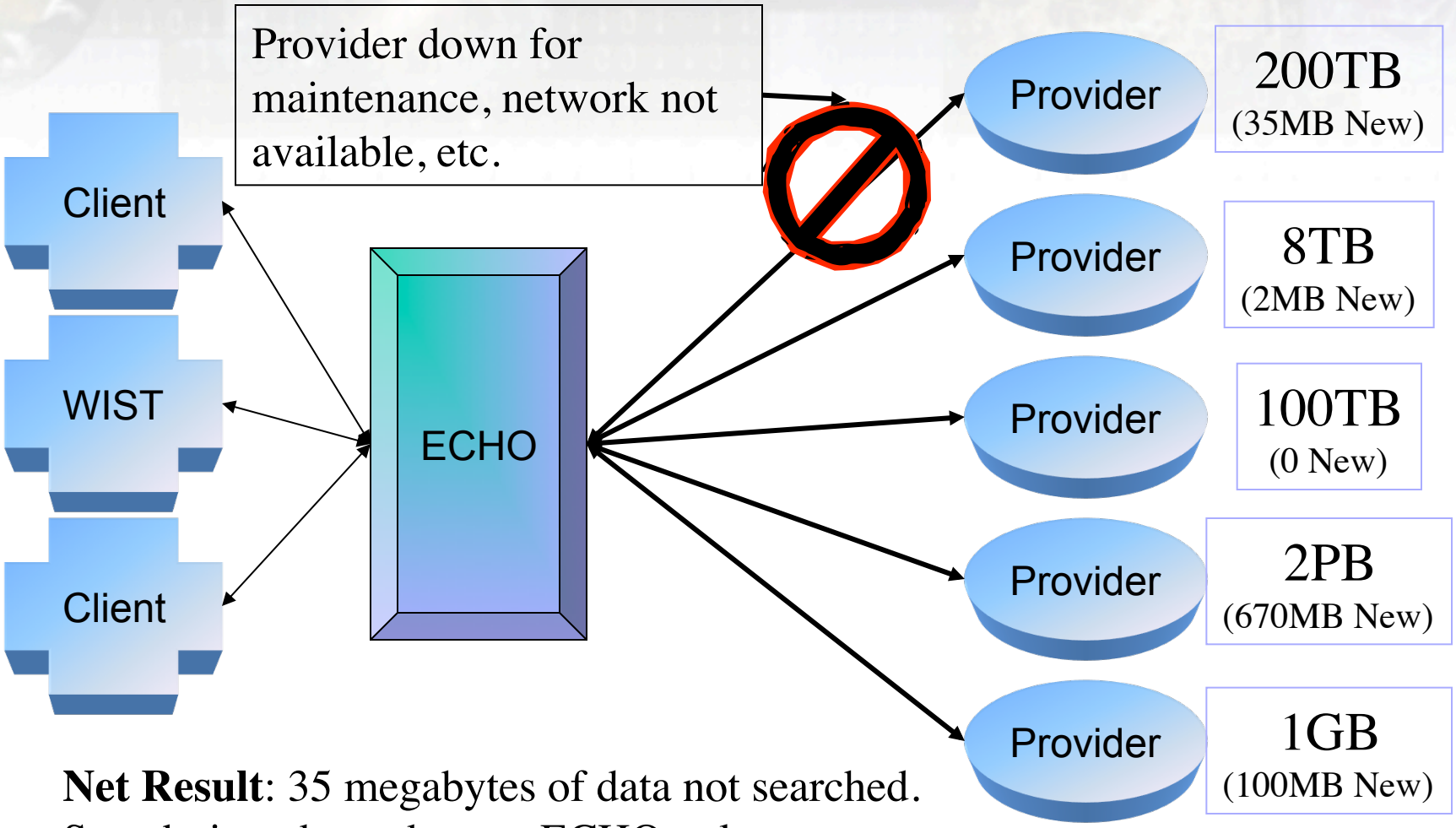
- **Publish Capability**
  - Advertisements
  - Service Interfaces
  - Service Implementations
  - Service GUIs
  - Linkage to Data Registry
- **Discovery Capability**
  - UDDI Standard Based
  - Data Registry View
    - ***What services are appropriate for this collection/granules?***
- **Future**
  - Service Brokering
  - Access Controls

Current Metadata Access



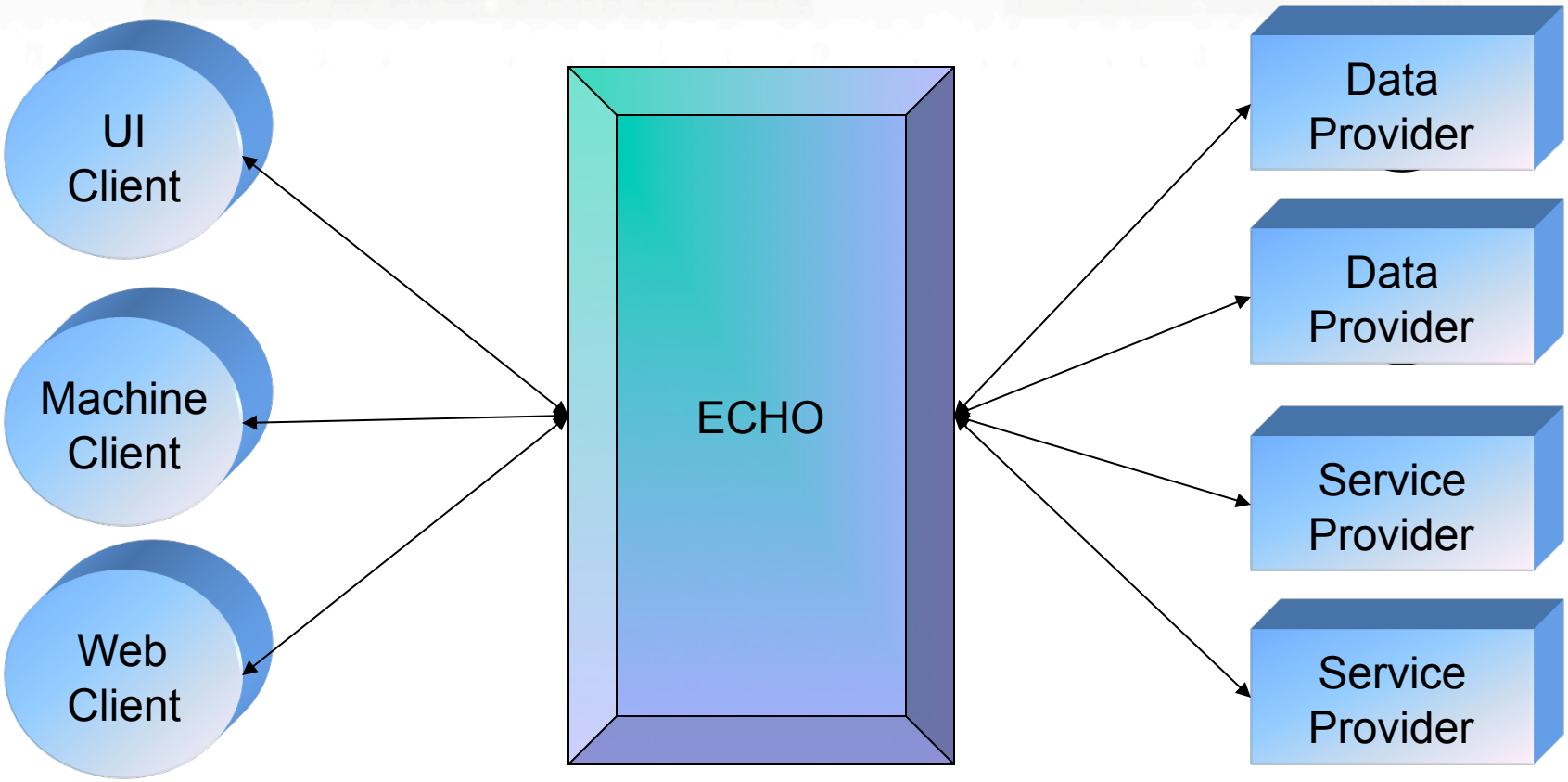
Net Result: 200 terabytes of data not searched.
Search time dependent on lowest common denominator.

ECHO Metadata Access

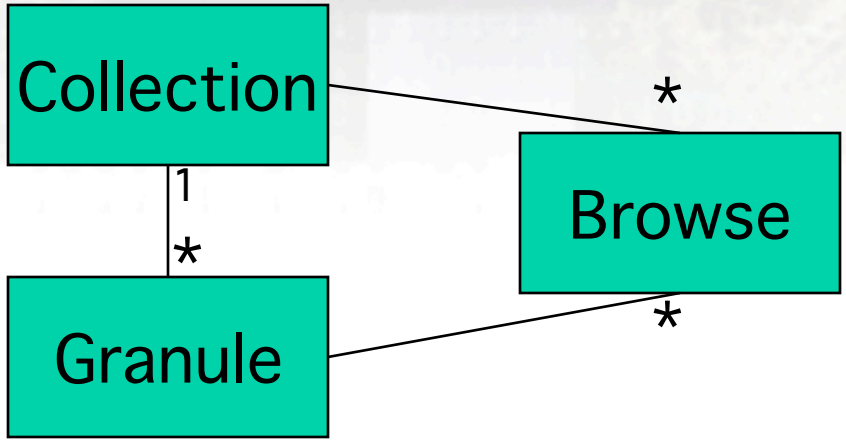


Net Result: 35 megabytes of data not searched. Search time dependent on ECHO only.

High Level ECHO Context



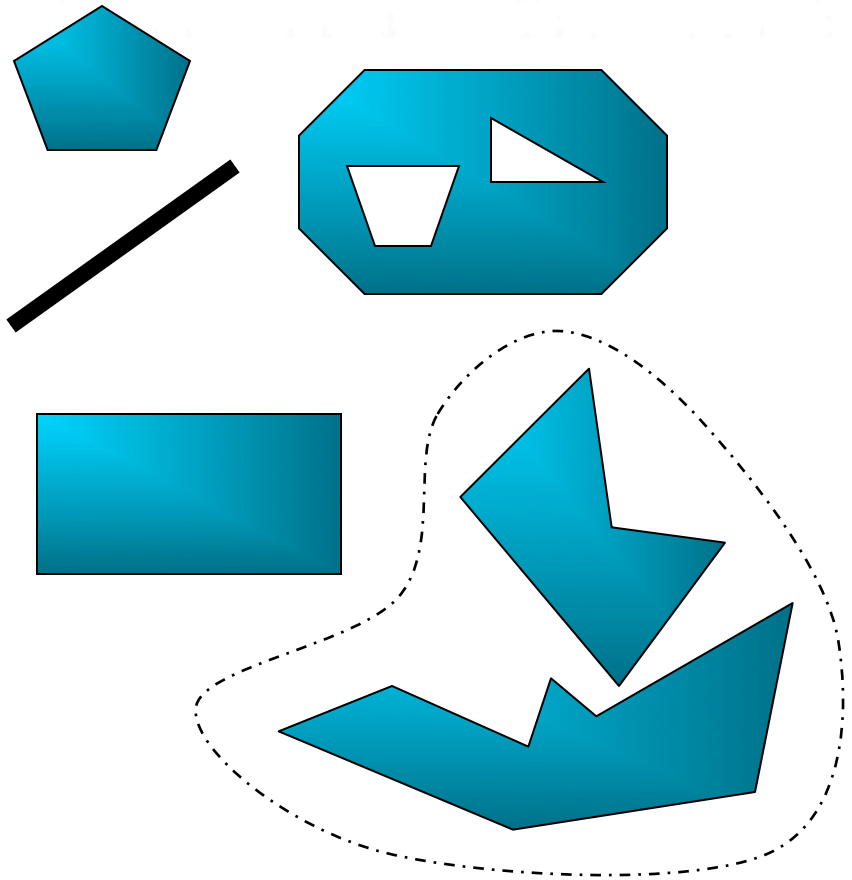
Simplified ECHO Metadata Model



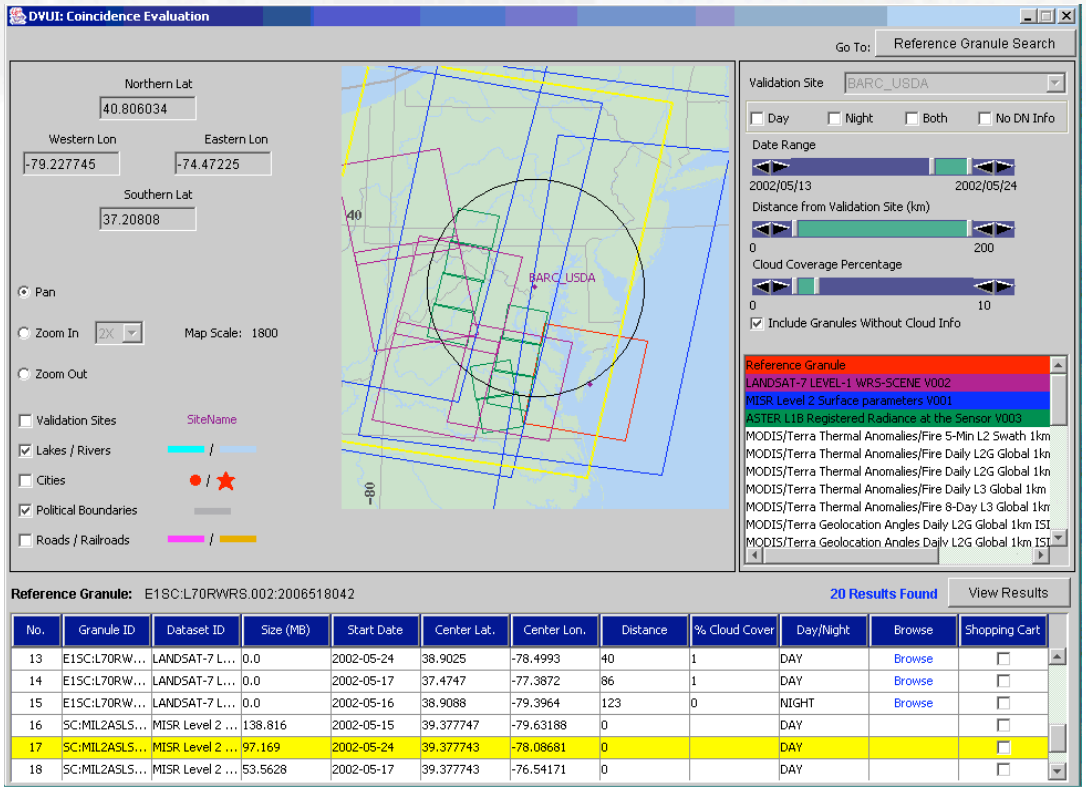
- **At the highest level, there are three main entities that are part of the ECHO conceptual data model**
  - Collection – A grouping of granules typically based on a common source of the granules
  - Granule – The lowest level item retrievable from a provider that is uniquely described in ECHO
  - Browse – Some kind of binary or ASCII file used to provide a user with a quick view of the data. This could be a scaled down version of the imagery, or a histogram of the data, or some other representation

Spatial Types Supported

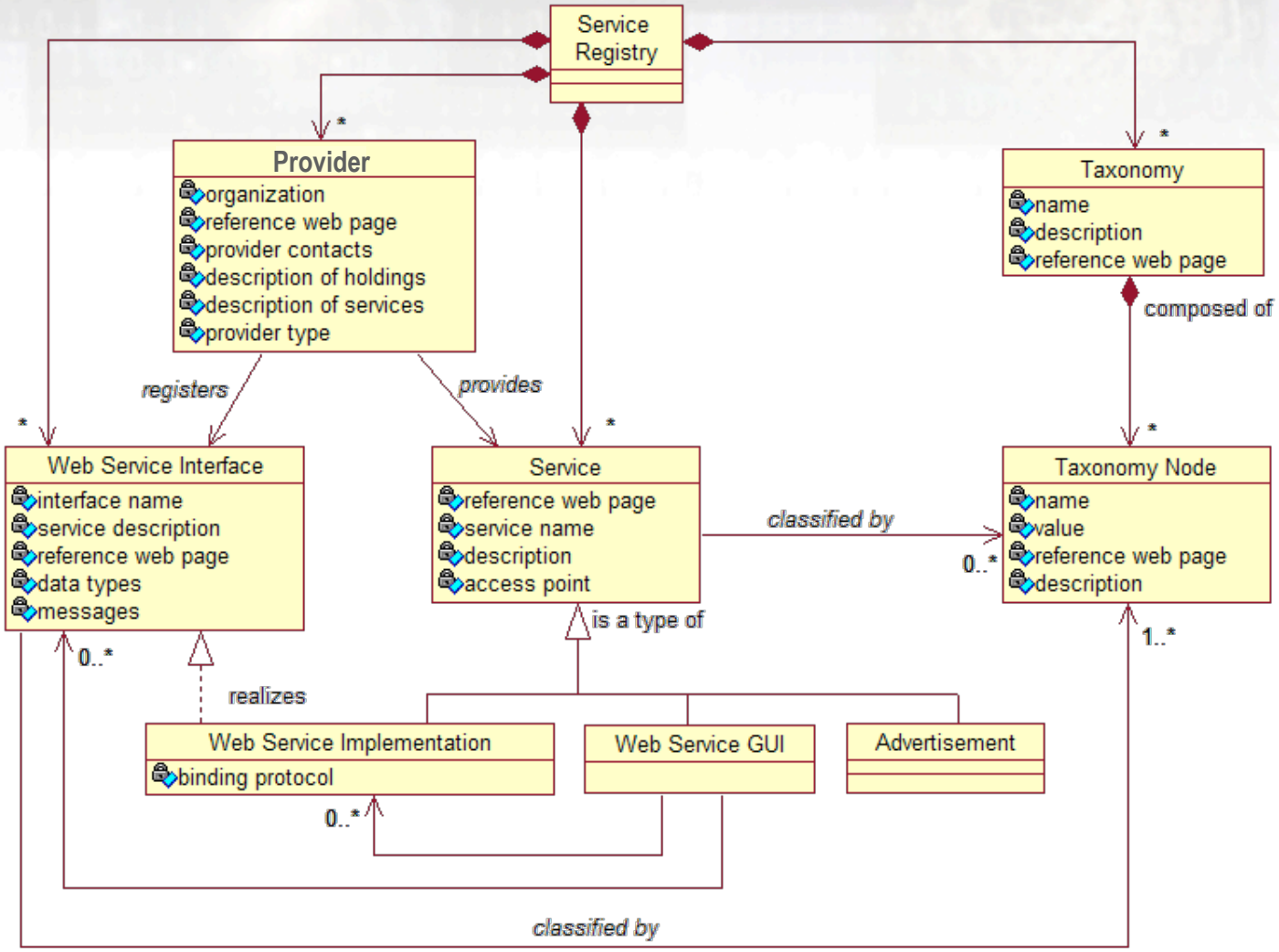
- Polygons and Polygons with holes
- Multi polygons
- Lines



Example Client Interface



Service Registry Domain Model



ECHO Data Partner Status

- **Disciplines represented by current Data Partners**
  - Synthetic Aperture Radar (SAR), Sea Ice, Polar Processes, Geophysics
  - Atmospheric Composition, Atmospheric Dynamics, Global Precipitation, Ocean Biology, Ocean Dynamics, Solar Irradiance
  - Radiation Budget, Clouds, Aerosols and Tropospheric Chemistry
  - Land Processes
  - Snow and Ice, Cryosphere and Climate
  - Biogeochemical Dynamics, Ecological Data, Environmental Processes
  - Oceanic Processes, Air-Sea Interactions
  - Population, Sustainability
- **Data Partner metrics (Sep 2005)**
  - Operational 4
  - In evaluation or test 4
  - Active development 2
- **ECHO's Current Holdings (Sep 09 2005)**
  - Collections 1931
  - Granules 48.9 million
  - Browse 10.5 million

ECHO Client Partner Status

- **Current client application scenarios**
  - Web-based, user interactive search and order
  - Desktop (installed) navigation/discovery
  - General purpose geospatial and temporal searching
  - Customized interfaces to facilitate specific communities and tasks (e.g. identification and acquisition of coincident multi-instrument, multi-DAAC data sets for MODIS land product validation)
  - Back-end harvesting tools to support client-side caching of key information
  - Additional value-added processing by clients (e.g. subset, stitch, resample, reproject, reformat)
  - Middleware components
- **Client Partner metrics (Sep 2005)**
  - Operational 1
  - In evaluation or test 2
  - Active development 7
  - Planning/requirements 4
  - Proposed 3

Further Interest?

- **Contact ECHO Operations**
  - echo@killians.gsfc.nasa.gov
  - +1 301 867-2071 (Weekdays, 08:00–19:00 ET)
- **Visit the ECHO Project Website**
  - http://eos.nasa.gov/echo
- **Join the ECHO Mailing Lists**
  - echo-all, echo-status, echo-client, echo-data
  - Descriptions on website “Contacts” page
  - Contact ECHO Operations to be added to these lists
- **Attend the weekly ECHO Technical Committee (ETC) telecon**
  - Learn about status, discuss issues, share approaches and solutions with the community
  - Contact ECHO Operations for ETC dial-in information